Lawrence Livermore National Laboratory

Science & Technology

Benefiting the State of California

LLNL researchers are using computer models to address the effects of climate change on the supply and demand for fresh water in California. Scientists are linking regional, global and surface hydrology models to predict surface temperature, precipitation, soil moisture content, water-equivalent snow depth, surface runoff, drainage, stream flow and flow through selected river basins. Ultimately, the projections will help California water officials assess the possible need for change in water management practices and/or new infrastructure for water storage and conveyance.

Since 2002, LLNL has been providing technical support to the California Highway Patrol to develop methods for ensuring the safe delivery of large fuel trucks and methods for stopping fuel trucks if they are hijacked by terrorists. Field trials are underway.

LLNL officials respond regularly when local Customs and Coast Guard officials at the San Francisco Airport and the Port of Oakland receive unusual alerts on their radiological pagers. The Lab has field-tested a number of portable radiation monitors at both locales to assist in the detection of weapons of mass destruction. In addition, LLNL is working closely with the California Highway Patrol to develop additional radiation detection technology to prevent smuggling of radioactive material into the State.

LLNL's new Homeland Security Organization is developing biological assays to help the California agricultural community deal with emerging livestock diseases. To date the Laboratory has developed detection technologies to rapidly identify tularemia (rabbit fever), Exotic Newscastle disease and salmonella. The ability to quickly detect these diseases (in a matter of hours rather than weeks) will save the agricultural industry millions of dollars.

The Laboratory, in conjunction with UC Davis and the State department of Health and Human Services and myriad other state emergency response organizations, is developing a proposal for advanced triage facilities, and new bio detection and bio surveillance systems for hospitals. In the event of a biological attack, these new systems would allow hospitals to continue to operate.

The Lab's Forensic Science Center has developed a number of chemical and explosive detection technologies, and has also responded to a number of special law enforcement cases in the state (i.e. the Fremont bombing case, and the Efren Saldvair, aka "Angel of Death," case.) Additionally, the Center is working with a number of state agencies to assist in and train on the detection of and response to weapons of mass destruction.

The National Atmospheric Release Advisory Capability Center (NARAC) at LLNL has conducted real-time emergency response assessments for a number of state emergencies over the past two decades. NARAC can predict the probable spread of airborne hazards, thereby assisting emergency response managers in deciding protective actions. In 1999, NARAC monitored the Chevron Refinery Fire, and in 1998, the Tracy Tire Fire. More recently, NARAC has supported several joint terrorist training exercises for the State, and is partnering with five cities in a pilot project to better plan for and respond to the release of chemical or biological agents.

In a collaboration supported by the U.S. Department of Agriculture and the National Science Foundation, the DOE Joint Genome Institute has completed the genetic blueprints of two plant pathogens, *Phytophthora ramorum,* the cause of Sudden Oak Death (SOD) and its cousin, *Phytophthora sojae,* responsible for over a $1 billion a year in losses attributed to this soybean disease. This new DNA sequence information will enable more sensitive and effective field detection systems and treatments for these pathogens.